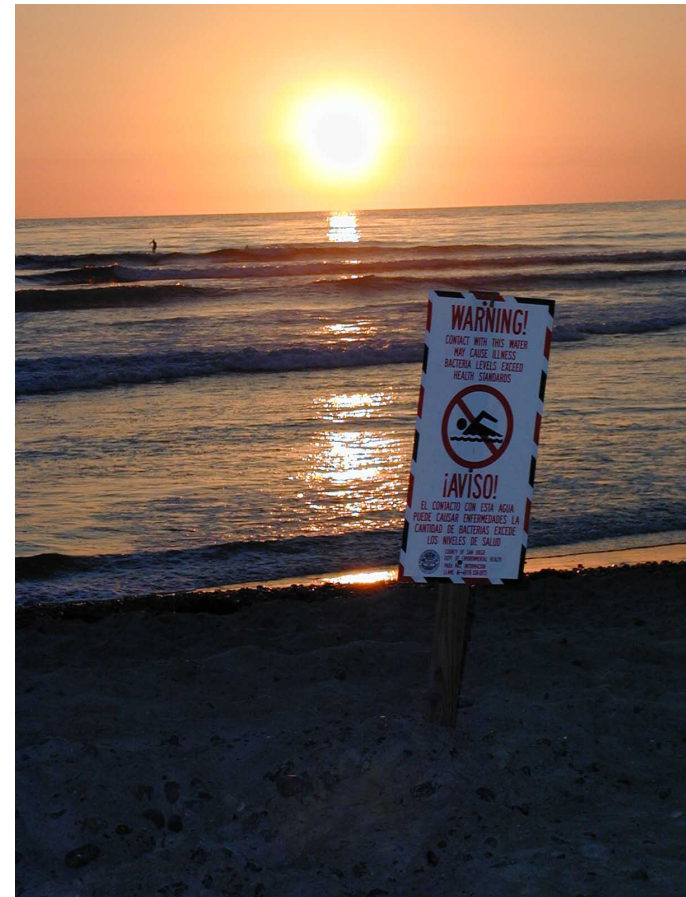


SAN DIEGO  
**COASTKEEPER®**  
KEEPING THE COAST CLEAR

# Protecting San Diego's Coast Since 1995

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San Diego Coastkeeper protects the region's bays, beaches, watersheds and ocean for the people and wildlife that depend on them.



*There are no guarantees that San Diego's magnificent coasts will remain forever.*

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# LID in San Diego - from litigation to cooperation

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 Caltrans

 Alliance for Compliance

 City of Escondido

 Advocate for LID in MS4 permit

 LID Manual (technical & legal support)

 Project implementation (outreach & tech support)



# Coastkeeper's current role in LID

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 City of San Diego

 County of San Diego



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# City of San Diego Projects

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## Currently in Design Phase

- Mt. Abernathy Green Street Infiltration Project (MB / LP)
- Dalbergia Street Green Mall Infiltration Project (CC)
- Memorial Park Green Lot Infiltration Project (CC)
- Kellogg Park Green Lot Infiltration Project (ASBS)

## Sites Currently in Conceptual Planning Phase for Potential LID\*\*

- Southcrest Park (CC)
- San Diego PD Western Division Office (SD)
- Mira Mesa Library (LP)
- Cabrillo Heights Park (MB / LP)
- Leon Avenue Right-of-Way (TJ)

 **\*\*NOTE:** Because conceptual planning and geotech studies are still occurring, exact project features are yet to be determine; sites may also be abandoned/replaced if not found feasible for infiltration.








# COC Phase 1 & 2 Pervious pavement





# Targeted pollutants



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-  Suspended Solids
-  Oil / Grease
-  Metals (Copper, Zinc, Chromium, Cadmium)
-  Organics
-  Nitrogen

**NOTE: These are consistent between Phase I & Phase II**

## Phase II expansion

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-  **Three additional porous paving test plots (54,000 sf)**
  - One additional porous concrete test plot
  - Two additional porous asphalt test plots
  - Geogrid stabilization under 1/2 of each new porous asphalt test plot
  - 26,000 sf of roof runoff diverted to porous asphalt test beds
  
-  **Enhanced monitoring to evaluate current/expanded BMP effectiveness**





# Costs for types of concrete & asphalt

## PHASE 2 PAVEMENT REPLACEMENT SQUARE FOOT COSTS 2007

<b>Porous Asphalt</b>	\$ 3.39	\$ 3.40	\$ 2.01	\$ 8.80	\$ 0.04	18"-30" excavation/backfill. 3" porous asphalt.
<b>Standard Asphalt</b>	\$ 2.13	\$ 1.04	\$ 1.32	\$ 4.49	\$ 0.06	6"-Excavation/Backfill. 6"-Asphalt.
<b>Porous Concrete</b>	\$ 3.64	\$ 3.40	\$ 7.10	\$ 14.14	\$ 0.02	18"-30" Excavation/Backfill. 5-1/2" pervious concrete.
<b>Standard Concrete</b>	\$ 1.51	\$ -	\$ 3.42	\$ 4.93	\$ 0.01	No new base material. 6"-Reinforced Concrete

## PHASE 1 PAVEMENT REPLACEMENT SQUARE FOOT COSTS 2005

<b>Porous Asphalt</b>	\$ 2.75	\$ 1.88	\$ 1.87	\$ 6.50	\$ 0.02	18"-Excavation/Backfill. 3"-Paver
<b>Porous Concrete</b>	\$ 3.19	\$ 1.88	\$ 6.34	\$ 11.41	\$ 0.04	

\*Square foot cost are based on actual cost received by the County of San Diego.



# Porous Profiles

1/2" OPEN GRADE AR16000 ASPHALT (MODIFIED)

1" X #4 AGGREGATE

1-1/2" WASHED AGGREGATE

MAXIMUM RESERVOIR DEPTH

NON-WOVEN GEO-TEXTILE

FLAT BED BOTTOM (NATIVE SOIL)

3"

1"-3"

12"- 18"

8"

## POROUS AS

5-1/2"

1"

12"-18"

8"

PERVIOUS CONCRETE

1" X #4 AGGREGATE

1-1/2" WASHED AGGREGATE

MAXIMUM RESERVOIR DEPTH

NON WOVEN GEO-TEXTILE

FLAT BED BOTTOM (NATIVE SOIL)

## POROUS CONCRETE

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# Virtual field trip



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# Virtual Field Trip



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# Virtual Field Trip





# Virtual Field Trip



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# Virtual Field Trip



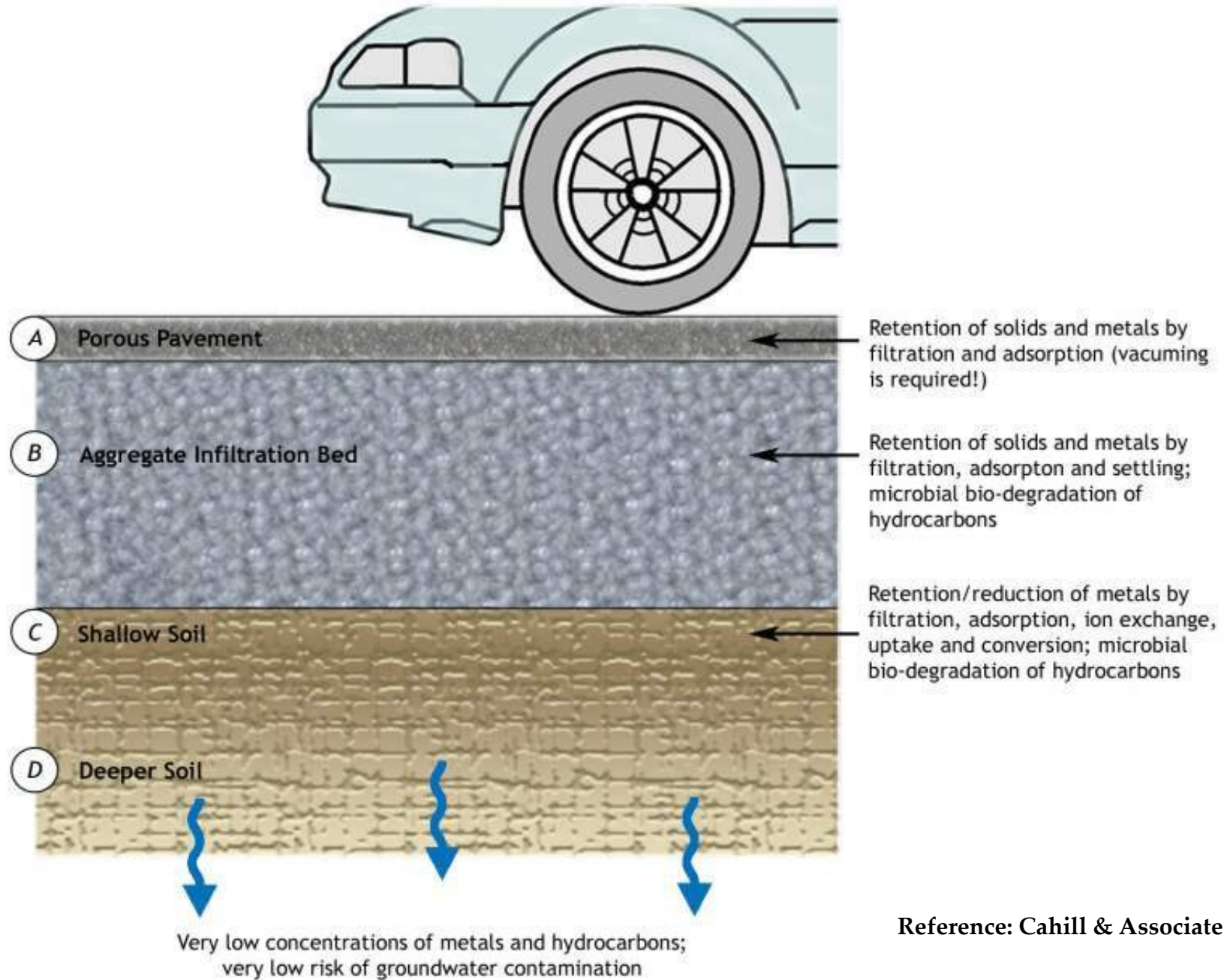
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# Virtual Field Trip



# LID Water Quality improvements



Reference: Cahill & Associates



# Monitoring Results

- Monitoring conducted wet season 2007-2008
- Take home: significant pollutant load reductions due to stormwater flow reductions
- Need longer term monitoring & funding!!

## Basin Volumes, 07-08 Storm Season

Site	Area (square feet)	Total Rainfall (ft) *	Volume (cubic ft)	Volume (L)
Concrete 1	14936	0.6408	9571.4867	271034.3196
Concrete 2	12100	0.6408	7754.0833	219571.1882
Asphalt 1	41092	0.6408	26333.1233	745671.0137
Asphalt 2	41900	0.6408	26850.9167	760333.2881
Pavers	7896	0.6408	5060.0200	143283.8101
Roof **	25000	0.6408	16020.8333	453659.4798
<b>TOTAL</b>	<b>142924</b>		<b>91590.4633</b>	<b>2593553.0995</b>

\* depicts total rainfall, in feet, for the 07-08 storm season, as measured by the Reference Site raingauge

\*\* Roof discharges into Asphalt 2



# Pollutant load reduction by pavement type

 Based on 100% containment of flow

Constituent	Average Load at Reference (g/L)	Average Load at Roof (g/L)	percent load reduction
Total Cadmium	2.11667E-06	2.8975E-07	86.31%
Diss. Cadmium	5.46667E-07	2.315E-07	57.65%
Total Copper	0.00022	0.000003575	98.38%
Diss. Copper	6.33333E-05	2.0325E-06	96.79%
Total Lead	0.000134667	0.00000744	94.48%
Diss. Lead	1.32667E-05	5.925E-07	95.53%
Total Zinc	0.003366667	0.000074	97.80%
Diss. Zinc	0.000773333	0.00005675	92.66%





# Actual Pollutant load

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Constituent	Concrete 1	Concrete 2	Asphalt 1	Asphalt 2	Roof	Pavers	TOTAL (All Sites)
Total Cadmium (g)	0.574	0.465	1.578	0.220	0.131	0.303	3.272
Diss. Cadmium (g)	0.148	0.120	0.408	0.176	0.105	0.078	1.035
Total Copper (g)	59.628	48.306	164.048	2.718	1.622	31.522	307.843
Diss. Copper (g)	17.166	13.906	47.226	1.545	0.922	9.075	89.840
Total Lead (g)	36.499	29.569	100.417	5.657	3.375	19.296	194.813
Diss. Lead (g)	3.596	2.913	9.893	0.450	0.269	1.901	19.021
Total Zinc (g)	912.482	739.223	2510.426	56.265	33.571	482.389	4734.355
Diss. Zinc (g)	209.600	169.802	576.652	43.149	25.745	110.806	1135.754

# Next Steps

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🦊 Develop brochure: Lessons Learned

🦊 Prop 50 & 84





## Contact:

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